Claims

1. A polypeptide comprising a human IGF-1 protein, wherein the amino acid glycine at position 42 is deleted or mutated, and wherein the numbering of the amino acids of said human IGF-1 protein corresponds to SEQ ID NO.: 1.

2. A polypeptide comprising a human IGF-1 precursor protein, wherein the amino acid glycine at position 42 is deleted or mutated, and wherein the numbering of the amino acids corresponds to SEQ ID NO.: 5.

3. A polypeptide according to claim 2, wherein the human IGF-1 precursor protein is fused to an immunoglobulin Fc region of a human IgG.

4. A polypeptide according to any of the claims 1-3, wherein the amino acid glycine at position 42 is mutated to serine.

5. A polypeptide according to any of the claims 2-4, wherein the human IGF-1 precursor protein comprises the Ea peptide and additional deletions or mutations of the amino acids selected from the group consisting of G1, P2, E3, R36, R37, K68, S69, A70, R71, S72, R74, R77 G96, S97, A98, G99, N100, K101, N102, Y103, Q104 and M105.

6. A polypeptide according to any of the claims 3-5, wherein the IGF-1 precursor protein and the Fc region are separated by a peptide hinge region.

7. A polypeptide according to claim 1, wherein the human IGF-1 protein comprises the following modifications:

   a. amino acids E3 is deleted,

   b. amino acid G42 is mutated to serine, and

   c. amino acid R37 is mutated to alanine,

   wherein the numbering of the amino acids of said human IGF-1 protein corresponds to SEQ ID NO.: 1.

8. A polypeptide according to any of the preceding claims, wherein the polypeptide comprises an E-peptide and wherein

   a. amino acids E3, R71 and S72 are deleted,

   b. amino acid G42 is mutated to serine, and

   c. amino acid R37 is mutated to alanine,

wherein the numbering of the amino acids of said human IGF-1 protein corresponds to SEQ ID NO.: 5.

9. The polypeptide of any of the preceding claims, wherein the Fc region is modified to modulate its binding to Fc receptor.

10. A polynucleotide comprising a nucleic acid molecule encoding the polypeptide according to any of claims 1-9.

11. A pharmaceutical composition comprising the polypeptide of any of claims 1-9, for use in therapy.

12. The pharmaceutical composition of claim 11 for the treatment of a muscle disorder in a patient in need thereof.

13. The pharmaceutical composition of claim 11 for the treatment of burn patients suffering from loss of lean body mass and/or muscle wasting.

14. The pharmaceutical composition of claim 11 for the treatment of Spinal and Bulbar Muscular Atrophy (SBMA or Kennedy disease) patients.

15. The pharmaceutical composition of claim 12, wherein the muscle disorder is muscle atrophy.

16. A polypeptide according to any of the preceding claims, wherein the amino acid glycine at position 42 is deleted.

17. A polypeptide according to any of the preceding claims, wherein the human IGF-1 precursor protein is pegylated.

1. A human IGF-1 protein, wherein the amino acid glycine at position 42 is deleted or mutated to serine, and wherein the numbering of the amino acids of said human IGF-1 protein corresponds to SEQ ID NO.: 1.

2. A human IGF-1 precursor protein, wherein the amino acid glycine at position 42 is deleted or mutated, and wherein the numbering of the amino acids corresponds to SEQ ID NO.: 5.

3. A polypeptide according to claim 2, wherein the human IGF-1 precursor protein is fused to an immunoglobulin Fc region of a human IgG.

4. A polypeptide according to any of the claims 2-3, wherein the amino acid glycine at position 42 is mutated to serine.

5. A polypeptide according to any of the claims 2-4, wherein the human IGF-1 precursor protein comprises the Ea peptide and additional deletions or mutations of the amino acids selected from the group consisting of G1, P2, E3, R36, R37, K68, S69, A70, R71, S72, R74, R77 G96, S97, A98, G99, N100, K101, N102, Y103, Q104 and M105.

6. A polypeptide according to any of the claims 3-5, wherein the IGF-1 precursor protein and the Fc region are separated by a peptide hinge region.

7. A polypeptide according to claim 1, wherein the human IGF-1 protein comprises the following modifications:

   a. amino acids E3 is deleted,
   b. amino acid G42 is mutated to serine, and
   c. amino acid R37 is mutated to alanine,

   wherein the numbering of the amino acids of said human IGF-1 protein corresponds to SEQ ID NO.: 1.

8. A polypeptide according to any of the preceding claims, wherein the polypeptide comprises an E-peptide and wherein

   a. amino acids E3, R71 and S72 are deleted,
   b. amino acid G42 is mutated to serine, and
   c. amino acid R37 is mutated to alanine,

   wherein the numbering of the amino acids of said human IGF-1 protein corresponds to SEQ ID NO.: 5.

9. The polypeptide of any of the preceding claims, wherein the Fc region is modified to modulate its binding to Fc receptor.

10. A polynucleotide comprising a nucleic acid molecule encoding the polypeptide according to any of claims 1-9.

11. A pharmaceutical composition comprising the polypeptide of any of claims 1-9, for use in therapy.

12. Use of the pharmaceutical composition of claim 11 for the manufacture of a medicament for treating muscle disorder in a patient in need thereof.

13. Use of the pharmaceutical composition of claim 11, for the manufacture of a medicament for treating muscle atrophy.

14. A polypeptide according to any of the preceding claims, wherein the amino acid glycine at position 42 is deleted.

15. A polypeptide according to any of the preceding claims, wherein the human IGF-1 precursor protein is pegylated.